MAY
1969
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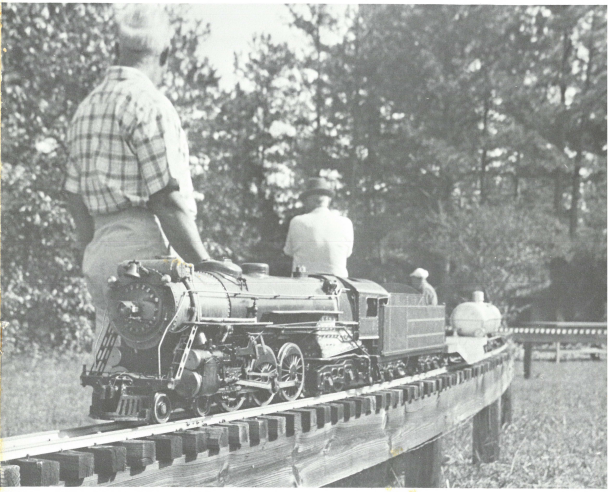
Live Steam®

THE MONTHLY MAGAZINE FOR ALL LIVE STEAMERS AND LARGE-SCALE MODEL RAILROADERS



The Case For 3/4 Inch Scale

Construction And Instruction In Live Steam

Live Steam
magazine

MAY 1969 VOL. 3 NO. 5

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COVER PHOTO

R. E. Thompson's ¾" Hudson at the Southeastern Live Steamer's fleet was built in 1939 from castings by Friends Models in Massachusetts. It's feed water heater, power reverse and turbo generator are operational. Photo by Sydney H. Watts.

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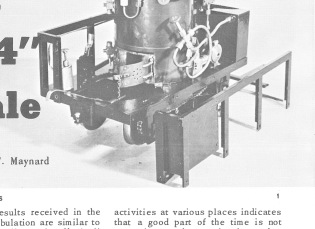
The Case For 3/4" Scale



by Robert W. Maynard

FRIENDS MODELS 1

If all the results received in the recent Club Tabulation are similar to the *Cinder Sniffers*, the "going" scale is 1½". But before everyone makes the decision to immediately abandon and never build anything smaller, I'd like to come to the defense of the erstwhile Champion, the ¾" scale locomotive.

I attended a meet a few weeks ago, and watching a man ten years my senior struggle to load a large Hudson in 1½" scale brought home to me the point in favor of a small engine. How easy it would have been to place a *Juliet* into a small suitcase type of carrier, pick it up, load it into the trunk of an automobile and drive merrily away!

I hear from all comers that the small engine can't keep up – keep up with what? The observance of activities at various places indicates that a good part of the time is not spent in actual operation but rather in standing around waiting. This is one point *not* in favor for the small 0–4–0 type of locomotive in ¾ inch scale. They run much better than they stand and wait.

Talk about running . . . a good ¾ inch *Juliet* or a high-wheeled 4–4–2 need not take a back seat to anything within reason. I say "within reason" because ten or twelve miles an hour is fast enough for safety, particularly when small children are riding behind.

Load-carrying ability did you say? Well a 1½" Pacific should handle a six-ton load, but who loads an engine with a train that heavy? On level track, a ¾ inch *Tich* with a two inch by two inch firebox can move a payload in excess of 300 lbs., but *Tich*

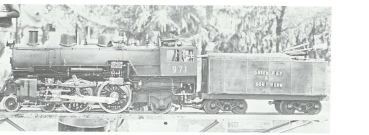
CARL HOFFMAN 2

can be a touchy little rascal and sometimes will not perform except for the experienced. A *Juliet* at 35 lbs., 2 x 4 inch firebox with 1 x 1½ inch cylinders (or any engine of similar size) will go "like a flash" and isn't too hard to handle. A ¾ inch 4–4–2 will handle a ton on level track, eleven adults and children on seven cars . . . and that particular engine has functioned as long as twenty hours without flue cleaning. It will also run more than a mile on one firing and stay in steam all day if you care to. The size will not impress you – engine and tender four feet long, total weight in two sections, 100 lb. engine and a 40 lb. tender. As for speed it will move over the rails in excess of twenty miles an hour, and that is about ten miles faster than it should be operated.

The cost of the larger scale engine will undoubtedly be greater and for small lathe owners, impossible to machine. The large boiler required for 1½" scale usually becomes a purchased item unless you are skilled enough at arc welding to fabricate your own. (NOTE: The fabrication of a steel boiler is not the place to learn the art of arc welding.) The silver soldering of a *small* copper boiler can be done with less equipment and, I believe, less practice.

To sum it up . . . there is a good bit to be said for the small scale locomotive. Cost, ease of construction, portability and storage are all credits. The large disadvantage of 3½" gauge is not the locomotive but the unstableness of the riding cars. This can be overcome by the addition of a third rail, although the appearance of this does not please some.

For those already involved in larger scales, the foregoing remarks will mean nothing, but for new members to the Live Steam Fraternity it would be well to consider all aspects of scale and gauge before starting your first locomotive; and do not fail to consider the advantages of the ¾" scale engine. (Next Month we will consider track-work for ¾" scale equipment.)



3 H. E. BRAKKE

4 LEWIS BULLOCK

Friends Models' "Tom Thumb" (1) in ¾" scale is a fine engine for a beginner, weighs about 40 lbs., can be built in 6–12 months and castings and other materials cost about $50 or so. Carl Hoffman built his 4–6–2 (2) from designs and castings by H. J. Coventry – it will pull 4 to 6 adults with ease. Larry Edwards' Atlantic (3) has probably turned its wheels on every 3½" gauge track in the country; you won't find a finer locomotive anywhere. Another popular design from Friends Models is the 4–6–6T engine (4) shown here with builder Dan Russell at the throttle. And just in case you thought all ¾" engines were small, here's a Friends Models (5) 4–6–6–4 which will disprove that theory!

5 FRIENDS MODELS

building the RARITAN

by William H. Morewood

A safety valve should lift at a given pressure and then allow the boiler to blow back to a slightly lower pressure before it reseats. The spring force determines the lifting pressure and the relationship between the shoulder on the Safety Valve Plug (13–8) and the step in the body determines the amount of blowback. The blowback should be kept to 5 psi or less. Adjusting this is a cut and try process. It may be done fairly readily with a small air compressor and a pressure gauge.

In the Steam Dome Cover (13–10), the bracket for the whistle valve lever may be made as a U shaped piece inserted into an end-milled slot in the cover and silver soldered. The four holes in the top should then be drilled and bored.

File the bottom edge later to accurately fit over the sheet metal jacket on the boiler.

The 1/16 wide bands should be polished and the other surfaces painted.

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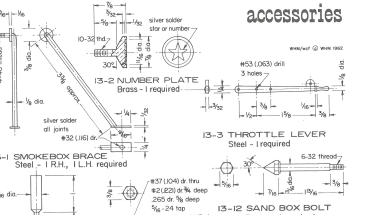
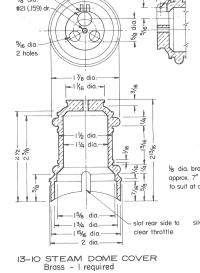
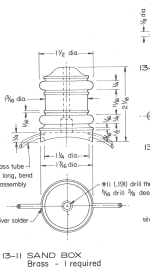
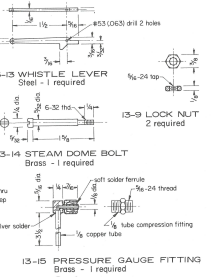

silver solder star or number
10-32 thd.
4-40 thread
silver solder all joints
#32 (.116) dr.
#53 (.063) drill
3 holes
13-2 NUMBER PLATE
Brass - 1 required
13-3 THROTTLE LEVER
Steel - 1 required
6-32 thread
13-1 SMOKEBOX BRACE
Steel - 1 R.H., 1 L.H. required
#37 (.104) dr. thru
#2 (.221) dr. ⅜ deep
.265 dr. ⅜ deep
¼-28 tap
finish with tool #13-4
13-12 SAND BOX BOLT
Brass - 1 required
number of turns 7
wire diameter approx. .030
I. D. ⅜32
free length ⅜
both ends ground square
13-4 BORING TOOL
Drill Rod - 1 required
13-5 SAFETY VALVE BODY
Brass - 2 required
13-6 SAFETY VALVE SPRING
Phos. Bronze - 2 req'd.
#20 (.064) drill
⅜ deep
slot for screwdriver
¼-24 thd.
#52 (.064) dr.
file exhaust hole ⅛ wide x ⅜ on each side
#3 (.185) drill .125 deep from point of drill
⅜ stainless steel ball, light press fit
cut this shoulder back a few thousandths at a time until the valve blows back only a few pounds.
13-7 SAFETY VALVE BONNET
Brass - 2 required
13-8 SAFETY VALVE PLUG
2 required




⅛ dia. brass tube approx. 7" long, bend to suit at assembly
#11 (.191) drill thru
⅜ deep
silver solder
13-11 SAND BOX
Brass - 1 required



PART EIGHT

VALVE GEAR

SO YOU WANT TO BUILD A LIVE STEAM LOCOMOTIVE

CHAPTER 10

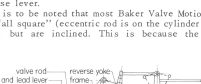
by Joseph F. Nelson

BAKER VALVE MOTION

This valve motion was designed by Abner D. Baker in 1903 and since the teens, has enjoyed a wide popularity mostly due to its installation on the USRA locomotives during World War I. The New York Central used this motion starting about 1929. Many of their earlier locomotives had their Walschaerts Valve Motion converted to Baker when major overhaul was necessary. Since it was so successful, a very large percentage of the later super-power locomotives were equipped with it. It is quite safe to say that if the steam locomotive existed today, practically all the new locomotives would be Baker equiped, excepting those with poppet valves.

There is a certain amount of controversy regarding its ancestry. Some authorities claim that it is a modified Walschaerts and other authorities claim that it is a Hackworth. Since the Walschaerts principle is based upon a vibrating link being driven from a single source – return crank, eccentric, or even the connecting rod – the Baker cannot possibly be a Walschaerts even though it has a lap and lead lever. In effect, its motion is just as much Hackworth as the Southern which is similar except that its lap and lead lever happens to be its eccentric rod. If one will analyze the many different versions of the Hackworth family, they cannot help but see the radius hanger with the fulcrum connected to the reverse lever. The other Hackworth version has a link block sliding in a link whose angle is controlled by the reverse lever.

It is to be noted that most Baker Valve Motions are not "all square" (eccentric rod is on the cylinder center line), but are inclined. This is because the Baker



BAKER VALVE MOTION (N.Y.C. HUDSON

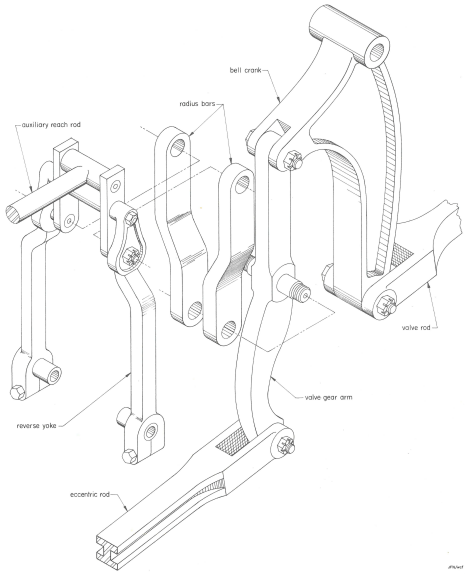
mechanism is actually above the valve rod, and, for design expediency, the motion is inclined from the return crank to the valve stem crosshead. However, for model work, the motion may be "all square". Since the Baker is a radial motion, it has constant lead. However, there are some minor differences between the Baker and Walschaerts in valve positions and corresponding crank positions but these differences are inconsequential and

BAKER VALVE MOTION

may be ignored. The one big advantage the Baker motion had over other motions on prototype equipment was a matter of maintenance. Since there were no sliding surfaces except the valve stem crosshead, the motion, in many cases, was designed with needle beatings and hardened pins. This pemitted many hours of operation without regreasing. Also, the number of miles between valve gear overhaul was increased many times.

The Baker Valve Motion is excellent for Live Steam locomotives provided that care is taken when locating and drilling the holes in the linkage. The pins must be carefully fitted to the holes since a small clearance multiplied by many joints will create a sloppy motion with all events coming late. With pins made from drill rod and hardened, and the levers made from high carbon flat stock and hardened, a Baker Valve Motion can be made for a Live Steam locomotive that will outlast the locomotive. As an alternative, the parts can be made from low carbon steel and case hardened with Kasenit (or equal). Since the recommended case is very thin, it is recommended that the time for maintaining the parts at a cherry red temperature be doubled, or even tripled while applying the carburizing powder. This will insure a reasonably thick case of tool steel (high carbon) and will extend the life of the valve motion.

The prototype Baker Valve Motion was normally made for piston valves; however, for Live Steam, it can be made for either inside or outside steam. When laying out the return crank, make certain that the return crank center aligns with the incline center line of the motion.



EXPLODED VIEW

TYPICAL BAKER VALVE GEAR

1

2

3

4

Pacific Coast Region of the NMRA visits

The Jamul Valley Railroad

Photos and report by Harry F. Haas

On Sunday, March 16th, 1969, Mr. and Mrs. Harry Haas hosted the Pacific Coast Region of the National Model Railroad Association Annual Meeting at their Jamul Valley Railroad in Jamul, California.

The Jamul Valley Railroad was started in 1965 and has grown to about 2,000 feet of 1½" track. This includes loading and steaming tracks, turntable, 2 engine houses, a 20-foot three-track car shed and a 200-foot trestle. There are three passing tracks to aid in operating in opposite directions at the same time.

The meeting started at 1:00 p.m. and trains ran continuously until 5:00 p.m. There were 152 registered adults and many, many kids. The PCR had door prizes, a pot luck dinner and sold coffee and cake. The weather was just perfect as is usual in sunny Southern California. (No smog here!) There was time for train talk and renewing old acquaintances, as well as the Annual PCR Business Meeting. A grand time was had by all.

Ace Wischstadt (1) looks over South Western 2–6–0 #2 that he and Jim Sheets recently purchased from the Jamul Valley Railroad. The locomotive was built by Harry Haas and has air brakes, air-operated bell and operating sand. Without motive power for his Jamul Valley Railroad now, Harry is working hard to complete his 1½" 4–6–4 (Santa Fe 3460 series) and get it operating this summer.

As Jim Sheets pulls by with his 1½" Mogul, (2) Ruth Ann Haas gets last minute instructions from husband, Harry, for operating Everett Penrod's 1½" Consolidation. That's Everett on the right.

Everett Penrod, back at the throttle of his 2–8–0, (3) heads out on to the main line with a full load of passengers, while a visiting Santa Fe switchman, (4) works at switching a train on the Jamul Valley Railroad. Being near the Mexican border, the "1" is pronounced as "li" resulting in "Hamul" for Jamul.

In Omaha they know well about the

Battle of the Boilers

by Jane Neely
Journalism Major
University of Nebraska

Hobbyists are seldom lobbyists, but if the Omaha Area Live Steam (OALS) Club members hadn't become involved, their hobby would soon be extinct.

Ron Beckman, a member from Council Bluffs, Iowa, explained, "In the fall of 1967, an Omaha *World-Herald* reporter featured our scale model steam powered locomotives in the paper. He had pictures as well as the names and addresses of our members. The next week our club president received a letter from the State Boiler Inspector, Emery R. Shaw, saying that unless our boilers had been built according to the American Society of Mechanical Engineers (ASME) Code, we were to cease operation immediately."

Since the members build their model locomotives themselves, Beckman said they naturally had not followed the ASME Code.

"This letter about put the club out of operation because very few live steamers operated as a hobby are built according to the code," OALS club secretary Robert Recic said.

"It would be so big and clumsy you couldn't put it in the small engines and most states don't bother anyone who is just operating as a hobby," Recic added.

"Last summer, instead of running our locomotives, we laid track and contacted Nebraska's Boiler Inspector, Mr. Shaw, and the Labor Commissioner Thomas D. Doyle about what we could do for our case," Recic said.

"We showed them boiler pictures and blueprints, but they were very hard-nosed that we conform to this law, seeing no way we could operate according to the law," Recic continued.

Club president, Donald Patrick of Omaha said the club discussed the future of the steam hobby at meetings and it was a unanimous decision to continue the club and hobby.

"So I wrote to other clubs to see if they had this legal problem and negative replies came. Finally the secretary of the Pennsylvania club advised me to write the New York club as he had heard of problems there. This was a successful lead because the New York club had enacted legislation in their Senate in 1965 to alter that state's confining law," Patrick said.

"After we were sent a copy of the New York amendment, we met with Doyle and Shaw again to plead our case. They both softened and said they would support similar legislation," Patrick said.

Patrick then contacted his state Senator, Henry F. Pedersen, Jr., about the club's need and on January 20, 1969, Nebraska legislature bill 573 was introduced in the Nebraska Unicameral. The bill stated that "boilers of a miniature model locomotive engine maintained as a hobby and not for commercial use" may be built without conforming to ASME requirements.

"For some reason the committee hearing, the lawmaking step which follows a bill's introduction, was held in March in the legislative chamber instead of the committee room where hearings are usually held. There we were in the big chamber talking about toy trains," Patrick said of Recic and himself.

In the hearing, however, Shaw objected to allowing a grate area of two square feet as New York had done, and revised the amendment limiting Nebraska hobbyists to a grate area of one and one-half square feet and an inside diameter of less than ten inches, Patrick said.

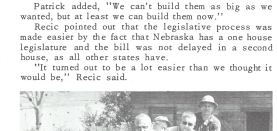
"This was agreed upon, the senators had no opposition to it, and in April, Governor Norbert T. Tiemann signed the bill. It will become law 90 days after the legislature adjourns, so our hobby will be legal about November," Recic said.

"We've accomplished something, at least," Beckman said.

Patrick added, "We can't build them as big as we wanted, but at least we can build them now."

Recic pointed out that the legislative process was made easier by the fact that Nebraska has a one house legislature and the bill was not delayed in a second house, as all other states have.

"It turned out to be a lot easier than we thought it would be," Recic said.



BERNARD KUNZ

At the Omaha Area Live Steam Club track south of Omaha are members (l to r) Ron Beckman, Earl Keslar, Robert Recic and Donald Patrick behind Beckman's 1 inch scale locomotive.

OALS ACHIEVEMENTS

Ron Beckman has built two scale models – one in 1 inch scale and the other in 1½ inch scale. Before the club was formed in 1967, Beckman had 230 feet of track around his yard in Council Bluffs. Now the club has several hundred feet of track south of Omaha.

Earl Keslar, the only member of the club that works for a railroad, has built a 2 inch scale Case tractor and is working on a 1 inch scale Pacific.

Don Patrick has two ¾ inch scale locomotives and is working on a 1 inch Atlantic started by G. D. Hewitt of Omaha, an associate member of the club.

Robert Recic is working on a 1½ inch Pacific.

Some thoughts on boiler laws ...from the cupola

Those of you who started with us in LIVE STEAM back in August 1966 will recall the preface to our comments in that first issue when we said: *"It is quite easy for humans to get wrapped up in a hobby to the point where one phase becomes THE most important, while other factors in enjoyment of the hobby go by unnoticed. In an attempt to avoid that situation in our present position, we feel it might be well for us to "take a walk back to the caboose" and make our observations and comments . . . from the cupola."*

We'd like to "call a meeting" and invite you all to come up in the cupola to discuss the matter of boilers which is so important to our hobby. We hope everyone will get the whole subject serious thought and we will point out at the very beginning that in this group are many divergent points of view. There are Live Steamers who must haul their equipment to another state to operate it; there will be some who will not even read this column through; some who insist that three-times operating pressure is no great test for a boiler test; those who are personally insulted by the suggestion of boiler testing; one or two who insist that the sky's the limit – literally – under the protection of "No Trespassing" signs; and a high-cube boxcar full of Live Steamers who couldn't care less about laws that restrict others but haven't affected them – *yet!*

The popular way to begin such a discussion today would be to list our RIGHTS as Live Steamers, as taxpayers, as citizens, as individuals or any of the multitudinous excuses for taking license . . . but since we have walked 'way back here to the cupola to get a different perspective on the subject, let's apply that logic right now.

Rights are merely the reward for assuming responsibility. Hey! There's a switch! How long has it been since you have heard that word? RESPONSIBILITY. At the drop of a draft card you could get long arguments that responsibility went out with the Model A, the treadle sewing machine and the steam engine!

. . . AND THE STEAM ENGINE.

That kind of "dates" us as Live Steamers, doesn't it? The very reason that draws us together – the steam engine – harks back into history to a point when "Responsibility" was a common household word.

Now, since Live Steamers are prone to reminisce, let's look back to the days of the steam engine and see what responsibilities might have been our lot in those days. Without writing them down, or even mentioning them, they would have included *the responsibility to design, build, maintain and operate our equipment in accordance with the best-known practices . . . and, most certainly, to inform ourselves of any potential problems we might encounter and help inform others on the basis of our own experiences.*

That doesn't sound too bad, does it? Read it over again. If you stop to think about it, it's what we have always done . . . except that no one ever bothered to write it down. Of course, no one really had to write it down then. Live Steamers were little groups of men in Danvers, Chicago, San Francisco, Montreal and Winnipeg who probably did as much work on other engines in the club as they did on their own. Quite different today. The very reason that our hobby enjoys such a following today is the one that is making passenger trains obsolete. A Live Steamer can drive from Chicago to Paoli or from Denver to San Francisco in less time than it used to take to drive from Hartford to Danvers or from Detroit to Chicago. There are now more than sixty Live Steam Club facilities in 25 states and 5 provinces of Canada where you can get first-hand information about this wonderful hobby.

But that's not all that has changed. Back in the "good ole days" we weren't plagued with lobbyists who, in the name of all things good, pressured our legislators into all sorts of restrictive laws "to protect the public." And we didn't have long waiting lines at our court rooms to seek redress for damages suffered or imagined.

With a jolt, this realization can bring us back to the present, can't it?

And where do you fall into the picture? Are you in one of the active groups of Live Steamers who must load your engine into a trailer or wagon and head across the state line to operate it? Sure, lots of us attend meets all over the country and think nothing of loading up and heading down the road. But that's different than living in a state where you *must* haul your engine – be it ½" scale or 1½" scale or whatever – to another state in order to operate it without threat of fine or imprisonment. There are lots of us in that very spot!

Or are you in the group that has many personal opinions about what you think is or is not your prerogative in the matter of Live Steam boilers?

Or the *wail stop* letter in this publication recently which suggests that coded boilers be just for those who want to haul passengers and "the rest of us" build the best boiler we know how and not spoil the hobby with regulatory restrictions. Unfortunately, there are many of us right now who would agree with that but we could build the best boiler we know how, put up high fences, "No Trespassing" signs and guards at the gate and still not be able to operate our locomotives legally.

Martin Evans took editorial exception in Model Engineer Magazine to Joe Nelson's comment for an initial boiler test at three times operating pressure. What would his thought be, we wonder, on the Michigan boiler law which requires that it be tested *annually* at three times operating pressure?

What too many Live Steamers do not realize is this: while some of us are defiantly proclaiming our rights, with our little engine clutched tightly to our breast, Big Brother is reaching over our shoulder to shut off our little Live Steam valves

one

by

one!

As far back as 1957, Carl Doughtery attempted to get some conformity in Live Steam boilers around the country but received very little encouragement and even less assistance. Many of the Live Steam clubs have their own requirements but no concerted effort has been directed toward reciprocity.

And nothing, *absolutely nothing*, has been done toward establishment of our own set of requirements for Live Steam boiler construction and operation on a national scale. Even

a hint of interest in our own behalf might give the suggestion of our own responsibility (there's that word again) in the matter. Certainly it is not impossible to think that Live Steamers are qualified and capable to prepare their own "code" and establish their own procedures in a field that no one else is at all versed in, much less interested in.

And the thought is not without precedent. Our Live Steam friends in Australia have very successfully formed the Australian Miniature Boiler Safety Committee and, in 1968, published the AMBSC Code – Part I for the inspection and testing of miniature boilers. It covers all-copper firetube boilers only, with other materials to be added at a later date. It covers boilers for use on locomotives up to 1" scale and is the best handbook on boiler constrution that has crossed our desk. The committee members are to be highly commended for their efforts.

Once a boiler is checked and approved by a club boiler inspector it is given a code number which identifies the club, date and number of record. This establishes that construction has been reviewed and, subject to the provisions of the code, is accepted by all other clubs in the country. Their hopes now are to have their code accepted by the Australian Government to cover Live Steam activities in that country.

So where does this leave us in North America? At this point we still sit at separate tables, discussing our own preferences and making our own local rules with no action toward establishment of a program for the whole of the hobby. At best we glance at stories about the problems of fellow Live Steamers in Nebraska, Tennessee or Michigan . . . ignoring the fact that it might next occur in Massachusetts or Illinois or Ontario or California or anywhere else!

We have a National Meet of the Brotherhood of Live Steamers coming up in Los Angeles in less than a year. We will again suggest (as we did a year-and-a-half ago) that a committee be organized immediately to review this problem and its possible solutions with the 1970 Meet as a tentative date for a report. We will offer all possible assistance to such a move, and hope that each club will designate at least one member to participate in the project. The direction and result of the study would then reflect all opinions and available infomation to make it a truly representative response to the problem of constricting legislation against the Live Steam hobby.

– W. C. F. –

HEAT TREATMENT for the apprentice

by Jack D. McKenty, M.D.

Part 1

Heat treatment in the home workshop is almost always limited to three procedures: the annealing or softening of copper, the annealing, hardening and tempering of carbon steel; and case-hardening mild steel. Heat treatment of high speed steel is usually beyond the scope of model engineering methods.

Sources of heat

The commonest and most convenient heat source is the propane torch. These can easily be obtained as "kits"; a metal case with one or two 1½ pound size propane tanks, two sizes of burners, a flame spreader, a paint scraper, a soldering tip, a spark igniter and often a tubing cutter since the torches are frequently used by plumbers running copper pipe. Accessories include a burner of large diameter and, of course, replacement tanks. About $10.

The tanks must not be refilled and are discarded when empty. The torches are "self-blowing." No special source of air or oxygen is needed. Flame temperature is about 1900° F., which is hot enough to melt small sections of brass for brazing.

Larger propane tanks are available; common sizes are thirty-five pounds (which is portable) and 100 pounds (which is not). The poundage refers to the weight of the propane; the tank weight is extra. The tanks may be purchased or rented. A refill for a hundred-pound tank is eight or nine dollars compared to $1.10 for the 1½ pound discardable tank. Don't rush out to buy a large tank, but bear it in mind for the future.

The larger tanks are used with a hose to a burner like those of the small ones. Hose and burners may be obtained from large hardware distributors. The large tanks have the same left hand thread connections as do acetylene tanks and, therefore, can be used with gas welding outfits for everything except the fusion welding of steel.

A blow torch may be used but it is noisy, fussy, hard to light and gives no warning before it goes empty at a crucial stage. Propane torches die away gently over a long period.

If you have natural gas available in your shop, a bunsen burner is cheap and very effective. There are

varieties of burners available in England for use with "town gas", but I have not seen any advertised on this continent.

If your kitchen has a gas stove it can be useful, especially if your wife is away a lot!

A Prestolite tank is a small tank of acetylene with a selection of small torches. It is more useful for small silver soldering or brazing jobs such as making or repairing jewelry.

A gas welding outfit with acetylene and oxygen tanks can be of great use to the model engineer, but acetylene is expensive and the flame produced is both too small and too hot to be convenient for heat treating. The welding outfit used with a large propane tank, as mentioned, is a little better for heat treating, but not much; the flame is still too hot and too small. About $100, tanks extra.

A muffle furnace is a small cast iron furnace with one, two or three natural gas burners. It is not convenient for softening copper sheet but it can do several other jobs. It is a bit too specialized for the average home work shop. Most of them come with a pot for melting lead, in case you have any use for a pot full of molten lead. It is very good for case hardening small parts. About $85.

Electric furnaces are expensive but there is one kind of electric furnace which is comparatively cheap. That is a kiln for ceramics. My Paragon kiln will hold 6" x 6" x 6", goes to 2300° F., runs on house current and costs $40. As with the muffle furnace it is of no use for annealing sheets of copper larger than 6" x 8½", propped up diagonally. It is excellent for case-hardening small parts and can also hold a #4 crucible and melt four or five pounds of bronze for small castings.

But, on consensus, the small propane torch is it.

Other Equipment

One or two fire bricks, an old wash basin full of vermiculite, a can of water, a pair of gas-pipe or slip joint pliers as tongs, and gloves, goggles and a fire extinguisher for safety. Vermiculite is sort of like fireproof popcorn and is obtainable as "Fire Base" wherever supplies for outdoor barbecues are sold.

Annealing Copper

Copper cannot be tempered. It can only be workhardened by hammering, bending and flexing it. The supposed "lost secret" of hardening copper is only a myth. The copper shields of three thousand years ago were wonderful until someone invented bronze swords. Then the old soldiers complained that the secret of hardening their shields had been lost.

Copper is most often used by model engineers for making boilers. It is usually obtained in hardened form and must be softened, or annealed, prior to bending or flanging it. The piece of copper to be annealed is placed on top of the vermiculite in the wash basin and heated with the largest burner of the propane torch. The entire piece of copper will heat up, but unless it is only a small size, only the area directly under the flame will get red hot. A dull red will do, it does not have to glow brightly. Move the torch around until the entire piece, or at least all of it that has to be bent, has been red.

The piece can be allowed to cool naturally or picked up by the pliers and dunked in a bucket of water, either way it ends up soft. Dunking it in water is faster and cleans off the scale that has formed from heating, but sometimes causes flat pieces to warp.

The procedure is repeated each time it gets hard from being worked on. In flanging the tube plate for a locomotive boiler, for example, the annealing might have to be done five or six times or more.

Instead of using water for the rapid cooling of the hot copper, you could use an "acid pickle." An 8% or 10% solution of sulfuric acid is usually advised, but sulfuric acid is sometimes hard to obtain and hydrochloric acid of the same strength may be used. I use a commercial toilet bowl cleaner. It contains about 7% HCl and is a nice blue color so that I don't mistake it for anything else. Rinse the work off in water after the acid bath.

If you do get hold of some concentrated sulfuric acid and wish to dilute it, always add the acid to the water, *NEVER* the other way around! Mixing sulfuric acid and water generates heat. If you do it wrong and add the water to the acid, enough steam can form to splash acid all over everything. This could spoil your whole day!

Live Steam

news

BRUMLEY BACK IN BUSINESS

Shortly after announcing that he would have to discontinue the line of trucks and castings for 1½" equipment, Evert Brumley re-established his arrangement with a foundry and may now continue the line of parts that he has advertised.

It's good to have Evert back in business at the same old stand – and you can reach him at Route #4, Box 222 in Winchester, Indiana 47394.

STEAM FILM LIBRARY PROGRESSING

Good response is reported in the efforts of the Southern Minnesota Live Steamers Association's attempt to preserve technical, training or publicity films of steam railroading. Several have been received and many more promised by the carriers.

As reported in the December 1968 issue of LIVE STEAM Magazine, the club is raising money for this project through the sale of some beautiful color etch prints of old time locomotives. The four prints, 10" x 4", are mounted with a white framing mat 13" x 7" and your cost is $4.00 per set. The money will be used to pay copying charges for the films – some of which are quite old. They will be made available to Live Steam groups for showing at meetings.

This is a worthy project which we should all get behind. After all, we are the beneficiaries of the club's efforts.

For further information, contact
Richard M. Winkle, President
Southern Minnesota
Live Steamer Association
220 First Avenue, S.W.
Rochester, Minnesota 55901

MICHIGAN STEAM LOCOMOTIVE CLUB MEET

Michigan Live Steamers will have a full day of activity on Saturday, September 20th.

At 10:00 a.m. a special train will leave the C&LC station at North Cadillac for a trip behind steam to Lake City. There will be time to inspect equipment on display there and to eat lunch in the C&LC Buffet Car before the trip back to North Cadillac.

Then a short drive to Wildwood Farm, home of the William Fitt family and headquarters for LIVE STEAM Magazine, where club members will inspect and discuss the site for a possible club track with facilities for ¾", 1" and 1½" operation.

For complete information about this meet, contact J. Bullock, Secretary, 94 Basswood Drive, Davison, Michigan 48423. Details will be mailed as soon as it is known how many will attend and arrangements can be completed with the C&LC for transportation and meals.

NEW BOOK ON CANADIAN NATIONAL STEAM POWER

A new book written by Anthony Clegg and Ray Corley is a detailed reference of the numbering, classification and ownership of more than 4,000 steam locomotives operated by the Canadian National Railways during the era of steam power from 1919 to 1960.

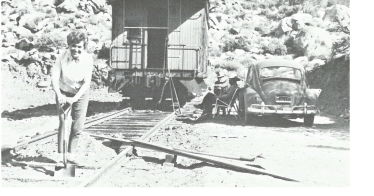
CANADIAN NATIONAL STEAM POWER contains a 30 page roster identifying locomotives and includes the usual builder, basic specifications, renumbering and disposal information. There are over 100 photos (both builder's and action) and a selection of 20 diagrams giving principal dimensions of the more important classes.

The book contains 120 9" x 12" pages with hard cover bound in durable leatherette and is available for $12.95 from Live Steamer William Dykeman, 890 Bay Avenue, Bathurst, N. B., Canada. Better place your order now!

THEY'VE BEEN WORKING ON THE (JT&S) RAILROAD

Joel Tedder (l) and John Mueller take time out on a warm day to try rerailing the club caboose with an auto jack. Too much "speed" took the car off the end of the rails when preparing for arrival of club's R.P.O.

PHOTOS BY JOEL TEDDER



Frank Venolia and Tom Coffey seek the shade to discuss Tom's 15" 2T Shay which is about ready for testing on air, while Pauline Tedder tries her hand at the time-honored task of the Gandy-Dancer.

TRACKWORK STARTED IN DENVER

Big news from Denver is that a track site has been located . . . and what a location! It is at the Colorado Museum of Transportation, in the shadow of a Big Boy and other full-size steam equipment on display.

Jerry Cutshall, Jim Patton and Kent Bolerjack appeared before the Board of Directors on April 10th to present their plans and on the following day it was announced that arrangements had been completed. Papers of incorporation have been filed and approved and work is under way on a 688 foot track for 3½" and 4¾" gauge equipment.

Work parties are frequent now as all effort is concentrated on getting the track in operation. If you aren't participating in this exciting activity, contact Kent Bolerjack, Secretary of the Colorado Live Steamers, Inc., 3228 W. Tufts Avenue, Englewood, Colorado 80110 immediately.

NOTES ON THE PASSING OF SEVERAL LIVE STEAMERS

Father Time continues his task and has recently selected several from the ranks of Live Steamers.

The Colorado Live Steamers Club bulletin for March 21st mentions that Art Wegner and Ralph Heikkila, both of Denver, Colorado had passed away during the previous month.

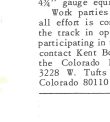
The Los Angeles *Engine Booster* for May noted the passing of Wayne Nutting on April 28th when a problem with the fuel system on his Stanley Steamer caused an explosion. Later in the week Mrs. Nutting died from injuries in the same mishap.

Lynn Lowe, of the Mid-South Live Steamers wrote to tell that he drove to Marion, Virginia, on June 11th to look up two Live Steamers listed in the BLS Directory. He stopped at the local police station to ask directions and was shocked to find that Walter Jackson had passed away two or three years ago and that Dr. John E. Griffiths had passed away two or three months ago.

Nothing further is available in the way of information about these Live Steamers and we echo the thought expressed by Lynn Lowe when he wrote, "What a pity that their fellow Live Steamers were so long in learning of these Live Steamers' deaths."

So that there will be no question about the listings in the BLS Directory, we have checked the obituary notices in LIVE STEAM and find that since the Directory listings were tabulated, the following deaths have been reported to LIVE STEAM Magazine. (The number in parenthesis after a name indicates the page where it is listed in the Directory.)

Gwynn Bishop (14), Gordon Corwin (15), Gene Hackley (20), Ralph Heikkila (40), Arthur Wegner (41), John Adams (41), Ernest Stalder (52), R. W. Christensen, Sr. (54), Clifford Witt (55), Percy Levitt (70), Dr. J. E. Griffiths (92), Walter Jackson (92). It might be well to make these notations in your copy of the BLS Directory.



August

3 PALATINE, LAKE ZURICH & WAUCONDA RAILROAD
2nd Anniversary Meet
4½" gauge
Frank Saville
512 Miller
Barrington, Ill. 60010
Phone 312 - 381-3070

9 SOUTHERN MINNESOTA
10 LIVE STEAMERS
3½"— 4¾" gauge
Al O'Neil's track — Lake City
Richard M. Winkle, President
220 First Ave., S.W.
Rochester, Minn. 55901

30 PENNSYLVANIA LIVE STEAMERS
31 Annual Fall Meet
2½" - 3½" — 4¾"
Wm. H. Scott, Secretary
R.D. 1, Box 400
Sellersville, Pa., 18960

31 FIRST TEXAS MEET
7½" Gauge
L. L. Yates' track
Box 631
Falfurrias, Texas 78355

September

6 IOWA MODEL STEAM ENGINEERS
Annual Fall Meet
Pershing G. Scott, Secretary
R.F.D. 1
Marion, Iowa 52302

13 GOLDEN GATE LIVE STEAMERS
Annual Fall Meet
2½"-3"— 4¾" — 7½"
Gordon French, Secretary
614 18th Avenue
Menlo Park, Calif. 94025
Phone 415 — 325-4209

19 NEW JERSEY LIVE STEAMERS
20 STEAMERS
21 ADVANCE REGISTRATION REQUIRED
3½" — 4¾" — 7¼"
Ralph Green, Secretary
845 Kilsyth Road
Elizabeth, N. J. 07208
Phone 201 — 353-4424

20 MICHIGAN STEAM LOCOMOTIVE CLUB
C & LC — Cadillac
J. Bullock, Secretary
94 Basswood Drive
Davison, Michigan 48423

October

4 LOS ANGELES LIVE STEAMERS
5 STEAMERS
Annual Fall Meet
2½" — 4¾" — 7½"
Joel Corbin, Secretary
12723 Kittridge Street
North Hollywood, Calif. 91606

11 PIONEER VALLEY LIVE STEAMERS
12 STEAMERS
13 3½" — 4¾" — 7¼"
Brenton W. Barnfather, Secy.
3 Fleetwood Drive
Sandy Hook, Conn. 06482

11 SOUTHERN MINNESOTA
12 LIVE STEAMERS
3½" — 4¾" gauge
Al O'Neil's track — Lake City
Richard M. Winkle, President
220 First Ave., S.W.
Rochester, Minn. 55901

Regular Run Days

GOLDEN GATE LIVE STEAMERS
Every Sunday, weather permitting
2½" — 3½" — 4¾" — 7½"
Gordon French, Secretary
614 18th Avenue
Menlo Park, Calif. 94025
Phone 415 — 325-4209

JAMUL VALLEY RAILROAD
3rd Sunday each month
7½" gauge
Harry F. Haas
Route 1, Box 47 A
Jamul, California 92035

NEW JERSEY LIVE STEAMERS
Each Sunday, May thru October
3½" — 4¾" — 7¼"
Ralph Green, Secretary
845 Kilsyth Road
Elizabeth, N. J. 07208
Phone 201 — 353-4424

PIONEER VALLEY LIVE STEAMERS
2nd Sunday each month
3½" — 4¾" — 7¼"
Brenton W. Barnfather, Secretary
3 Fleetwood Drive
Sandy Hook, Conn. 06482

PENNSYLVANIA LIVE STEAMERS
May 11, June 15, July 13,
Aug. 10, Sept. 14, Oct. 12
Wm. H. Scott, Secretary
R.D. 1, Box 400
Sellersville, Pa. 18960

LOS ANGELES LIVE STEAMERS
1st Sunday each month
3½" — 4¾" — 7½"
Joel Corbin, Secretary
12723 Kittridge Street
North Hollywood, Calif. 91606

MONTREAL LIVE STEAMERS
1st Sunday & 3rd Sunday
3½" — 4½" — 7¼" gauges
S. H. Galloway, Secretary
53 Brentwood Road
Beaurepaire, Quebec, Canada

RED RIVER VALLEY RAILWAY
Every Sunday, weather permitting
June 1st through Sept. 30th
2½" — 3½" — 5" gauge
Paul Wilke, Secretary
304 — 1179 Grant Ave.
Winnipeg 9, Manitoba, Canada

RIVERSIDE LIVE STEAMERS
4th Saturday-Sunday each month
Hunter Park — Iowa & Columbia Ave.
Riverside, California
Francis H. Dewey, Secretary
5536 Dewey Avenue
Riverside, California 92504
Phone 688-9533 or 683-9628

SOUTHERN CALIFORNIA LIVE STEAM CLUB
3rd Sunday each month
3½" — 4¾" — 7½"
K. G. Kasper, Secretary
2764 Maple
Rialto, California 92376

WABASH, FRISCO & PACIFIC
Every Sunday
12" gauge
Grand and First Streets
0.4 miles south of Post Office
Glencoe, Missouri

WAUSHAKUM LIVE STEAMERS
2nd Sunday each month
8:30 a.m. to 4:00 p.m.
3½" gauge, on Route 126
Ashland, Mass.
Wendell C. Bishop, Secretary
52 Pond Street
Natick, Mass. 01760

mail stop

D&RGW SAVED!!

The Colorado Legislature has given approval to a measure creating a state Railroad Authority which would have the ability to issue revenue bonds to buy the Denver & Rio Grande Western's Narrow Gauge line from Alamosa to Durango. The measure was sponsored by Clarence Quinlan of Antonito (House of Representatives) and cleared both houses by an overwhelming vote! The Railroad Authority would consist of the Governor, several state administrative officials and directors chosen by the Governor. It would be required to lease operation of the line, or portions of it, to private concerns with lease payments used to retire the revenue bonds.

It is similar to a bill passed by the New Mexico Legislature empowering that state to create a similar authority to operate portions of the line in that state. Quinlan said the rail line was needed to spur tourism in the Four Comers Area. The measure does not affect the Silverton Branch.

I received several thousand signatures from all over and I'm thankful to all. There is no way to tell just how large of a part the signatures played in getting this needed legislation, but like fire insurance, I would hate to have been without them.

R. KENT BOLERJACK
3228 W. TUFTS AVENUE
ENGLEWOOD, COLO. 80110

SR&RL 24-JUNIOR

My gosh, that is good! I can't tell you how happy I am to have the copy of LIVE STEAM and to see Dick Stolzenfel's 24-Junior in print. Thank you so much.

Not being bent toward modeling I'm pretty weak on the subject generally and had never heard of LIVE STEAM before. I think it's a dandy little magazine, exceptionally well done in regard to the graphic arts and ditto for makeup and subject matter. Even dour old crab that I am, I enjoyed perusing the magazine and shall file it with my favorite items.

Dick has been here several times and has threatened to run the 24-Junior into his wagon and bring her to Maine to show to me but I suspect, as you chucklingly editorialize, if I want to see her in the flesh I better ask for passes to California.

Dick would seem to qualify as a master craftsman with a deep sentiment for the more beautiful things in life . . . in this case the Sierra River engines. When making the front nameboplate for the 24-Junior he made me a duplicate, nearly three inches in diameter, which adorns the wall of my den at home. I have to blow up a full head of imagination to look at it and see the rest of the engine puffing mightily out into the room, a dozen boxcars reeling behind and the jaunty combination #11 tailing the train. But I can do it!

Thanks again for thinking of me with this copy. I'm really delighted to have it.

2-Footishly yours,

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Complete RR blueprints of Great Northern 2–8–2. Some in 1½" scale, some 1" scale. Erection print 1" scale with full scale dimensions throughout. Best offer, worth $200. Ray Grosser, 710 25th Avenue, N., St. Cloud, Minn. 56301.

Ammco 7" shaper (same as Delta) good condition, take cash offer or trade for 1½" scale aluminum rail or part payment on 9" or larger lathe. Also have 22¢ of 12 lb. rail to sell. A. Clerici, 4969 Dry Creek Road, Napa, Calif. 94558.

12" gauge precision built 3400 class Santa Fe steam locomotive, tender and six cars and new rail. Send $1 for photos and details. K. E. Reynolds, 110 S. Tyler Road, Wichita, Kansas 67209.

A once in a lifetime opportunity. Beautiful 1½" scale model (Little Engines castings) Union Pacific 825 series 4–8–4. Never run farther than back and forth on a 350 to 400 foot portable track and is not even broken in. The exhaust is very square forward and reverse, having a bark that can be heard a block or more away. Pulls 30–40 persons with ease and a dream to run. Paint job is wonderful, axles are all Timken or ball bearing, proportions are strictly scale working model. Two pair Nces, brakes, etc. Oil firing at present, have grates if needed. Loco, tender, four flat cars, 400' track, accessories all contained in heavy tandem axle trailer, totally enclosed. This equipment could not be duplicated for $30,000 on today's market. The owner-builder will entertain reasonable offers, as his health does not permit his operating this loco any more. Fred Harmer, 309 Wayside Rd., Hopkins, Minn. 55343.

SAFETY FIRST
is not a slogan. It is
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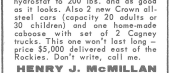

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1968 Catalog

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SCREWCUTTING LATHE

STANDARD LATHE. On this machine the knobs fitted to the feedscrews are machined from alloy and are not graduated; they are secured on the feedscrew by means of a grubscrew. The topslide is fitted to the crossslide by means of a bolt and tee nut.

SPECIAL LATHE. This machine has knobs machined from steel, and these are fitted with a frictionally adjustable ring which is graduated in .001" divisions. The method of fixing to feedscrews allows of a very fine adjustment of backlash. The topslide base is machined with a spigot which fits into a socket in the cross-slide and is locked in required position with Allen screws, bearing on angular pins, which lock topslide in position both radially and face to face with cross-slide.

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